

What is claimed is:

Apparatus for Grasping A Frangible Conical Confection Shell

1. An apparatus for grasping a frangible conical confection shell, said apparatus comprising:

(a) a mounting plate having first and second sides, said mounting plate having a plurality of apertures adapted to accept a frangible conical confection shell from said first side;

(b) a pair of opposed arms associated with each said aperture and attached to said second side of said mounting plate, the opposed arms adapted to be moved between a closed gripping position engaging the confection shell, and an open position releasing the confection shell; and

(c) an actuator that moves the opposed arms between a closed gripping position whereby the arms engage the confection shell, and an open position releasing the confection shell.

2. An apparatus according to claim 1 wherein each pair of opposed arms associated with each aperture comprises a single loop of flexible material embodying the pair of opposed arms, the single loop of flexible material adapted to be flexed between a relatively open position and a relatively closed position.

3. An apparatus according to claim 2 wherein each pair of opposed arms includes flattened surfaces adapted to engage a conical shell.

4. An apparatus according to claim 2 wherein the actuator that moves said opposed arms comprises at least one actuator plate bearing pairs of fixed pins that engage respective ends of each said loop of flexible material, said actuator plate

positioned so as to be capable of moving with respect to said mounting plate so as to cause each said loop of flexible material to flex between a relatively open position and a relatively closed position.

5. An apparatus according to claim 1 wherein each aperture is provided with a cylindrical cone-holding member extending from the first side of the mounting plate.

6. An apparatus according to claim 1 additionally comprising a transport mechanism adapted to move the mounting plate from a position wherein the conical shell is held in an upright posture to a position wherein the conical shell is held in a inverted posture, and to convey said conical shell while held in said inverted posture.

7. An apparatus for grasping and retaining a frangible conical confection shell, said apparatus comprising:

(a) a carrier plate having first and second sides, the carrier plate having a plurality of receiving apertures, each receiving aperture adapted to accept a frangible conical confection shell from the first side;

(b) a pair of support plates residing adjacent to the second side of the carrier plate and slidably coupled thereto, each of the support plates having a plurality of receiving apertures located to be aligned with the receiving apertures in the carrier plate and adapted to accept the frangible conical confection shell;

(c) a retaining pin associated with each receiving aperture and residing adjacent to a bottom side of each support plate, each retaining pin having a pair of opposed arms moveable between a closed position and an open position for grasping and releasing a confection shell, respectively;

- (d) a guide post associated with each retaining pin, the guide posts for slidably coupling the support plates to the carrier plate and for securing each retaining pin;
- (e) an actuator pair associated with each retaining pin and attached to the bottom side of each support plate, the actuator pairs provided to move the opposed arms of the retaining pins between the closed position and the open position upon slidable displacement of the support plates; and
- (f) an actuating means for causing slidable displacement of the support plates.
8. An apparatus according to claim 7 wherein each retaining pin comprises a single loop of flexible material embodying the pair of opposed arms, the retaining pin adapted to be flexed between the open position and the closed position.
9. An apparatus according to claim 8 wherein each said pair of opposed arms includes flattened surfaces adapted to engage a conical shell.
10. An apparatus according to claim 7 wherein the actuating means comprises one or more cams positioned along the length of a conveyor that transports the apparatus, the one or more cams operative to slidably displace the support plates upon contact with a portion thereof.
11. An apparatus according to claim 7 wherein each aperture is provided with a conical shell retaining member that extends from the first side of the carrier plate.
- Apparatus for Grasping, Inverting, and Coating a Frangible Conical Confection Shell
12. An apparatus for grasping, inverting and a coating material to a portion of a frangible conical confection shell, the apparatus comprising:

(a) a mounting plate having first and second sides, the mounting plate having a plurality of apertures adapted to accept a frangible conical confection shell from the first side;

(b) a pair of opposed arms associated with each aperture and attached to the second side of the mounting plate, the opposed arms adapted to be moved between a closed gripping position engaging the confection shell, and an open position releasing the confection shell; and

(c) an actuator that moves the opposed arms between a closed gripping position whereby the opposed arms engage the confection shell, and an open position releasing the confection shell;

(d) a transport mechanism adapted to move the support plate from a position wherein the conical shell is held in an upright posture to a position wherein the conical shell is held in an inverted posture, and to convey the conical shell while held in the inverted posture; and

(e) a coating material application device disposed beneath the transport mechanism and arranged so as to contact the coating material with a portion of the conical shell while the conical shell is in the inverted posture.

13. An apparatus according to claim 12 wherein the coating material application device propels the coating material upward, such that the interior portion of the conical shell is provided with a coating of the material while the conical shell is in the inverted posture.

14. An apparatus according to claim 13 wherein the coating material application device is selected from the group consisting of sprayers and bubblers.

15. An apparatus according to claim 12 wherein the coating material application device comprises a liquid bath that is disposed under the transport mechanism and is adapted to be lifted upward so as to provide a liquid coating to the open end edge of the conical shell.

16. An apparatus for grasping, inverting and a coating material to a portion of a frangible conical confection shell, the apparatus comprising:

(1) a conical shell grasping an retaining apparatus, comprising:

(a) a carrier plate having first and second sides, the carrier plate having a plurality of receiving apertures, each receiving aperture adapted to accept a frangible conical confection shell from the first side,

(b) a pair of support plates residing adjacent to the second side of the carrier plate and slidably coupled thereto, each of the support plates having a plurality of receiving apertures located to be aligned with the receiving apertures in the carrier plate and adapted to accept the frangible conical confection shell,

(c) a retaining pin associated with each receiving aperture and residing adjacent to a bottom side of each support plate, each retaining pin having a pair of opposed arms moveable between a closed position and an open position for grasping and releasing a confection shell, respectively,

(d) a guide post associated with each retaining pin, the guide posts for slidably coupling the support plates to the carrier plate and for securing each retaining pin,

(e) an actuator pair associated with each retaining pin and attached to the bottom side of each support plate, the actuator pairs provided to move the opposed arms of the retaining pins between the closed position and the open position upon slidable displacement of the support plates; and

(f) an actuating means for causing slidable displacement of the support plates;

(2) a transport mechanism adapted to move the conical shell grasping and retaining apparatus from a position wherein the conical shell is held in an upright posture to a position wherein the conical shell is held in an inverted posture, and to convey the conical shell while held in the inverted posture; and

(3) a coating material application device disposed beneath the transport mechanism and arranged so as to contact a portion of the conical shell with the coating material while the conical shell is in the inverted posture.

17. An apparatus according to claim 16 wherein the coating material application device propels the coating material upward, such that the interior portion of the conical shell is provided with a coating of the material while the conical shell is in the inverted posture.

18. An apparatus according to claim 17 wherein the coating material application device is selected from the group consisting of sprayers and bubblers.

19. An apparatus according to claim 16 wherein the coating material application device is comprised of a liquid bath that is disposed under the transport mechanism and adapted to be lifted upward so as to provide a liquid coating to the open end edge of the conical shell.

Method for Grasping, Inverting and Transporting a Plurality of Frangible Conical Confection Shells

20. A method of grasping, inverting and transporting a plurality of frangible conical confection shells, the method comprising the steps of:

(1) providing:

(a) a mounting plate having first and second sides, the mounting plate having a plurality of apertures adapted to accept a frangible conical confection shell from the first side,

(b) a pair of opposed arms associated with each aperture and attached to the second side of the support plate, the opposed arms adapted to be moved between a closed gripping position engaging the confection shell, and an open position releasing the confection shell, and

(c) an actuator that moves the opposed arms between a closed gripping position whereby the opposed arms engage the confection shell, and an open position releasing the confection shell,

(2) placing the pair of opposed arms in the open position;

(3) placing a confection shell in an upright position in each aperture;

(4) placing the pair of opposed arms in the closed position;

(5) inverting the mounting plate so as to place the confection shells in an inverted position;

(6) transporting the mounting plate from a first point to a second point; and

(7) again inverting the mounting plate so as to place the confection shells in an upright position.

21. A method according to claim 20 additionally comprising the steps of (8) placing the pair of opposed arms in the open position, and (9) removing the conical shells from the apertures.

22. A method of grasping, inverting and transporting a plurality of frangible conical confection shells, the method comprising the steps of:

placing a plurality of conical confection shells in a upright position;

inverting the plurality of conical confection shells without piercing the conical confection shells;

transporting the plurality of conical confection shells from a first point to a second point; and

again inverting the plurality of conical confection shells so as to place the conical confection shells in an upright position.

23. A method according to claim 22 additionally comprising the step of moving the conical confection shells from the second point to a third point.

24. A method of grasping, inverting and transporting a plurality of frangible conical confection shells, the method comprising the steps of:

(1) providing a conical shell grasping and retaining apparatus, comprising:

(a) a carrier plate having first and second sides, the carrier plate having a plurality of receiving apertures, each receiving aperture adapted to accept a frangible conical confection shell from the first side,

(b) a pair of support plates residing adjacent to the second side of the carrier plate and slidably coupled thereto, each of the support plates having a plurality of receiving apertures located to be aligned with the receiving

apertures in the carrier plate and adapted to accept the frangible conical confection shell,

(c) a retaining pin associated with each receiving aperture and residing adjacent to a bottom side of each support plate, each retaining pin having a pair of opposed arms moveable between a closed position and an open position for grasping and releasing a confection shell, respectively,

(d) a guide post associated with each retaining pin, the guide posts for slidably coupling the support plates to the carrier plate and for securing each retaining pin,

(e) an actuator pair associated with each retaining pin and attached to the bottom side of each support plate, the actuator pairs provided to move the opposed arms of the retaining pins between the closed position and the open position upon slidable displacement of the support plates; and

(f) an actuating means for causing slidable displacement of the support plates;

(2) placing the pairs of opposed arms of each retaining pin in the open position;

(3) placing a conical confection shell in an upright position in each receiving aperture;

(4) placing the pairs of opposed arms of each retaining pin in the closed position;

(5) inverting the conical shell grasping and retaining apparatus so as to place the conical confection shells in an inverted position;

(6) transporting the conical shell grasping and retaining apparatus from a first point to a second point; and

(7) again inverting the conical shell grasping and retaining apparatus so as to place the conical confection shells in an upright position.

Method for Grasping, Inverting, and Coating a Plurality of Frangible Conical Confection Shells

25. A method of grasping, inverting, and coating a plurality of frangible conical confection shells, said method comprising the steps of:

(1) providing:

(a) a mounting plate having first and second sides, the mounting plate having a plurality of apertures adapted to accept a frangible conical confection shell from the first side,

(b) a pair of opposed arms associated with each aperture and attached to the second side of the support plate, the opposed arms adapted to be moved between a closed gripping position engaging the confection shell, and an open position releasing the confection shell, and

(c) an actuator that moves the opposed arms between a closed gripping position whereby the opposed arms engage the confection shell, and an open position releasing the confection shell,

(2) placing the pair of opposed arms in the open position;

(3) placing a confection shell in an upright position in each aperture;

(4) placing the pair of opposed arms in the closed position;

(5) inverting the mounting plate so as to place the confection shells in an inverted position;

(6) coating a portion of the confection shells; and

(7) again inverting the mounting plate so as to place the confection shells in an upright position.

26. A method according to claim 25 additionally comprising the steps of (8) placing the pair of opposed arms in the open position, and (9) removing the conical shells from the apertures.

27. A method of grasping, inverting, and coating a plurality of frangible conical confection shells, said method comprising the steps of:

(a) placing a plurality of conical confection shells in an upright position;

(b) inverting the plurality of conical confection shells without piercing the conical confection shells;

(c) coating a portion of the confection shells while in an inverted position; and

(d) again inverting the plurality of conical confection shells so as to place the conical confection shells in the upright position.

28. A method according to claim 27 additionally comprising the step of moving the conical confection shells from a first point to a second point.

29. A method of grasping, inverting, and coating a plurality of frangible conical confection shells, said method comprising the steps of:

(1) providing a conical shell grasping and retaining apparatus, comprising:

(a) a carrier plate having first and second sides, the carrier plate having a plurality of receiving apertures, each receiving aperture adapted to accept a frangible conical confection shell from the first side,

(b) a pair of support plates residing adjacent to the second side of the carrier plate and slidably coupled thereto, each of the support plates having a plurality of receiving apertures located to be aligned with the receiving apertures in the carrier plate and adapted to accept the frangible conical confection shell,

(c) a retaining pin associated with each receiving aperture and residing adjacent to a bottom side of each support plate, each retaining pin having a pair of opposed arms moveable between a closed position and an open position for grasping and releasing a confection shell, respectively,

(d) a guide post associated with each retaining pin, the guide posts for slidably coupling the support plates to the carrier plate and for securing each retaining pin,

(e) an actuator pair associated with each retaining pin and attached to the bottom side of each support plate, the actuator pairs provided to move the opposed arms of the retaining pins between the closed position and the open position upon slidable displacement of the support plates; and

(f) an actuating means for causing slidable displacement of the support plates;

(2) placing the pairs of opposed arms of each retaining pin in the open position;

(3) placing a conical confection shell in an upright position in each receiving aperture;

(4) placing the pairs of opposed arms of each retaining pin in the closed position;

(5) inverting the conical shell grasping and retaining apparatus so as to place the conical confection shells in an inverted position;

(6) coating a portion of each conical confection shell with a coating material; and

(7) again inverting the conical shell grasping and retaining apparatus so as to place the conical confection shells in the upright position.

30. A method according to claim 29 additionally comprising the steps of (8) placing the pairs of opposed arms of each retaining pin in the open position, and (9) removing the conical confection shells from the receiving apertures.

31. A method according to claim 29 additionally comprising the step of moving the conical confection shells from a first point to a second point.